Federal Aviation Administration

Quarterly Launch Report
3rd Quarter 2005

Featuring the Launch results from the 2nd Quarter 2005 and Forecasts for the 3rd and 4th Quarters of 2005

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Introduction

The Third Quarter 2005 Quarterly Launch Report *features launch results from the second quarter of 2005 (April-June 2005) and forecasts for the third quarter of 2005 (July-September 2005) and fourth quarter of 2005 (October-December 2005). This report contains information on worldwide commercial, civil, and military orbital and commercial suborbital space launch events. Projected launches have been identified from open sources, including industry references, company manifests, periodicals, and government sources. Projected launches are subject to change.*

This report highlights commercial launch activities classifying commercial launches as one or both of the following:

- *Internationally-competed launch events (i.e., launch opportunities considered available in principle to competitors in the international launch services market)*
- *Any launches licensed by the Office of Commercial Space Transportation of the Federal Aviation Administration under 49 United States Code Subtitle IX, Chapter 701 (formerly the* Commercial Space Launch Act*)*

Contents

Cover (Zenit 3SL photo copyright © 2005, courtesy of Sea Launch): A Zenit 3SL, marketed by Sea Launch, sends Spaceway 1, operated by DirecTV, on its way to geosynchronous orbit on April 26, 2005 from the Odyssey Launch Platform in the Pacific Ocean.

Second Quarter 2005 Highlights

On April 5, the Russian space agency Roscosmos announced plans with Ukraine's NPO Yuzhnoye to launch a new, upgraded version of the Cyclone booster in 2006. The Cyclone 2K, equipped with an Apogee Propulsion Module, the APM 600, will launch from Baikonur and be able to deploy payloads of up to 2,000 kilograms (4,400 pounds) into a sun-synchronous orbit. The booster will be available commercially.

On April 15, ConeXpress announced its Orbital Life Extension Vehicle, CX-OLEV, had passed its Baseline Design Review milestone, clearing the way for the space tug to offer servicing missions for operational satellites starting in 2008. Over 70 communications satellites through 2012 have been identified as candidates for life extension using CX-OLEV.

The U.S. Air Force awarded SpaceX a $100 million contract to provide a series of low-cost orbital launches using the company's Falcon booster.

The Air Force also awarded Orbital Sciences Corporation a contract to develop the Raptor 1 and 2 vehicles to provide rapid "responsive space launch capabilities." Based on Orbital's Pegasus vehicle, the Raptor 1 is a winged three-stage rocket, deployed from a carrier aircraft and igniting on release. The Raptor 2 will be deployed from a C-17 cargo plane.

EADS announced it would abandon plans to develop the upgraded Ariane 5 ECB booster due to a lack of potential customers. The Ariane 5 ECB was to feature a restartable Vinci cryogenic engine capable of carrying 12 metric tons (26,500 pounds) to geosynchronous transfer orbit. It was to have first flown in 2006.

In May, Khrunichev State Research and Production Space Center signed a contract with the Russian Ministry of Defense to conduct research, development and flight-testing of the Angara launcher through 2010. The Angara commercial launcher concept was unveiled at the 1999 Paris Air Show, but since then there had been little indication the project was still ongoing.

On May 16, American millionaire Gary Olsen, the third would-be space tourist, resumed cosmonaut training at Star City near Moscow. He is expected to fly to the ISS aboard a Soyuz scheduled for launch on October 1, 2005.

New NASA Administrator Mike Griffin announced that the Crew Exploration Vehicle would be ready to fly in 2010, the same year the Space Shuttle is slated for retirement. This marked a departure from Griffin's April comments, which called for the first CEV flight in 2014.

In June, Turkey announced the establishment of a 15-year National Space Program to be run by the country's Air Force and the Turkish Science and Technology Research Association, TUBITAK. The first 10-year phase calls for the establishment of a Turkish space agency. In the second phase, Turkey plans to send Air Force pilots abroad for training as astronauts, most likely to Russia to fly on Soyuz launches to the International Space Station. The country hopes to launch its own astronaut in 2015 using a "national launch vehicle."

On June 21, after nearly three years of delays, a Russian Volna rocket launched the Planetary Society's Cosmos 1—the first solar sail demonstrator. Unfortunately, the payload was lost in the Barents Sea when the Volna's first stage separation failed 83 seconds into the flight. Cosmos 1 project director Louis Friedman has stated plans to "try again," though details remain unspecified.

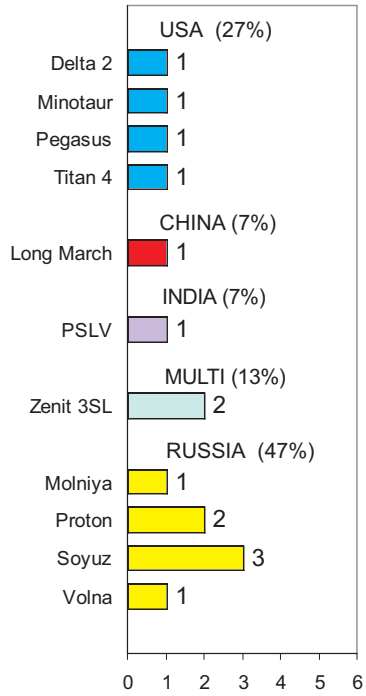
Also on June 21, NASA Administrator Mike Griffin made a speech advocating commercialization of ISS resupply efforts. After the shuttle retires in 2010, Griffin said, NASA should buy ISS launches from private commercial providers. To facilitate this shift, Griffin plans to devote $100 million of NASA's current budget toward studying and developing a requirements-driven vehicle procurement process.

In late June, two Senate committees approved authorization and appropriations bills for NASA. On June 24, the Senate Appropriations Committee unanimously passed a bill allocating $16.4 billion for NASA for fiscal year 2006. The measure included $250 million for a possible Shuttle mission to service the Hubble Space Telescope—a mission that had been deemed unlikely until NASA Administrator Mike Griffin expressed his openness to the idea in April. Separately, the Senate Commerce Committee unanimously passed an authorization bill setting NASA policy. The bill requires NASA to finish assembly of the ISS and continue operating the Space Shuttle until a successor vehicle is completed.

Vehicle Use

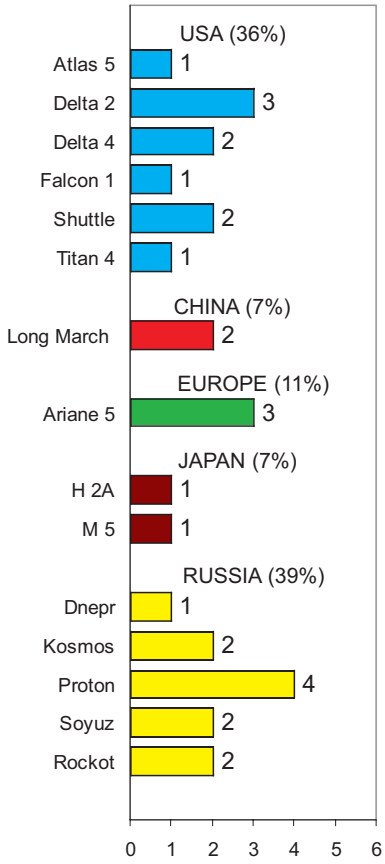
(April 2005 – December 2005)

Figure 1: Second Quarter 2005 Total Launch Vehicle Use



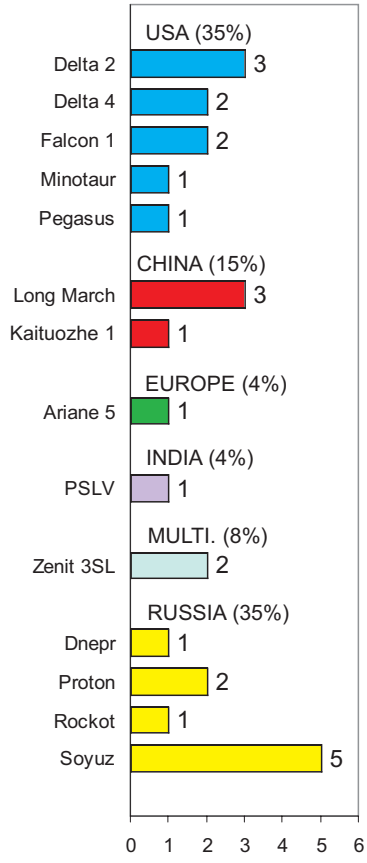
Total = 15

Figure 2: Third Quarter 2005 Total Projected Launch Vehicle Use



Total = 28

Figure 3: Fourth Quarter 2005 Total Projected Launch Vehicle Use



Total = 26

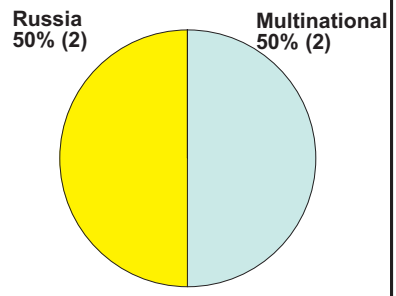
Figures 1-3 show the total number of orbital and suborbital launches (commercial and government) of each launch vehicle and the resulting market share that occurred in the second quarter of 2005, as well as projecting this information for the third quarter of 2005 and fourth quarter of 2005. The launches are grouped by the country in which the primary vehicle manufacturer is based. Exceptions to this grouping are launches performed by Sea Launch, which are designated as multinational.

Note: Percentages for these and subsequent figures may not add up to 100 percent due to rounding of individual values.

Commercial Launch Events by Country

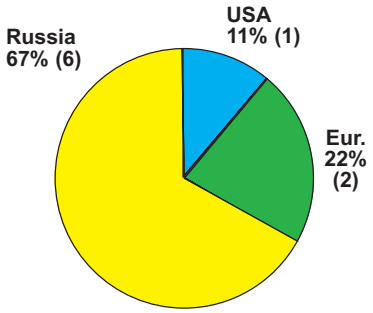
(April 2005 – December 2005)

Figure 4: Second Quarter 2005 Commercial Launch Events by Country



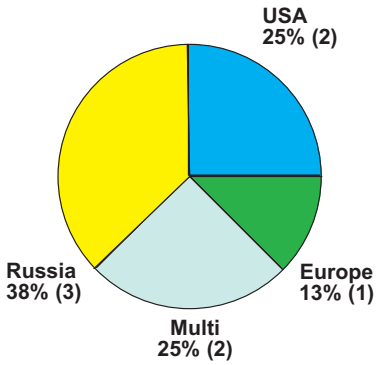
Total = 4

Figure 5: Third Quarter 2005 Projected Commercial Launch Events by Country



Total = 9

Figure 6: Fourth Quarter 2005 Projected Commercial Launch Events by Country



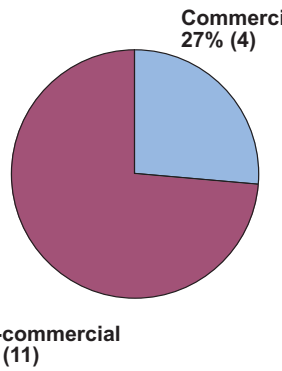
Total = 8

Figures 4-6 show all *commercial* orbital and suborbital launch events that occurred in the second quarter of 2005 and that are projected for the third quarter of 2005 and fourth quarter of 2005.

Commercial vs. Non-commercial Launch Events

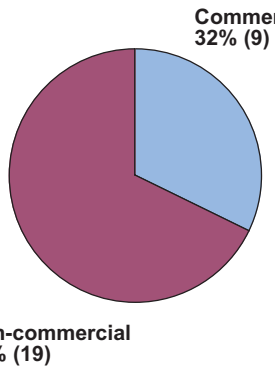
(April 2005 – December 2005)

Figure 7: Second Quarter 2005 Commercial vs. Non-commercial Launch Events



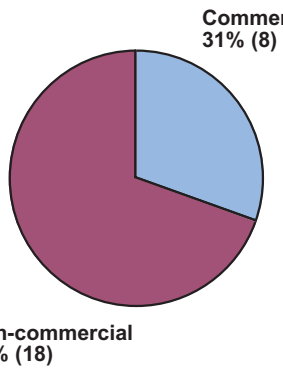
Total = 15

Figure 8: Third Quarter 2005 Projected Commercial vs. Non-commercial Launch Events



Total = 28

Figure 9: Fourth Quarter 2005 Projected Commercial vs. Non-commercial Launch Events



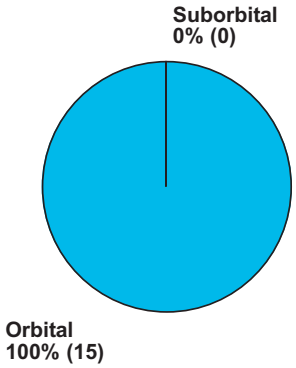
Total = 26

Figures 7-9 show commercial vs. non-commercial orbital and suborbital launch events that occurred in the second quarter of 2005 and that are projected for the third quarter of 2005 and fourth quarter of 2005.

Orbital vs. Suborbital Launch Events

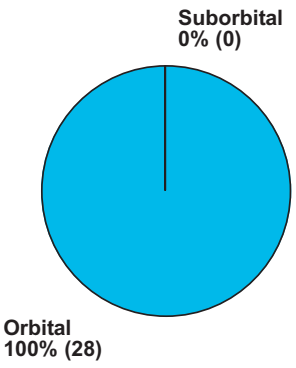
(April 2005 – December 2005)

Figure 10: Second Quarter 2005 Orbital vs. Suborbital Launch Events



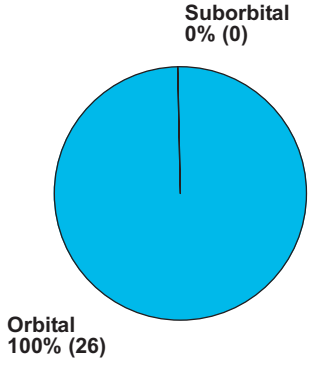
Total = 15

Figure 11: Third Quarter 2005 Projected Orbital vs. Suborbital Launch Events



Total = 28

Figure 12: Fourth Quarter 2005 Projected Orbital vs. Suborbital Launch Events



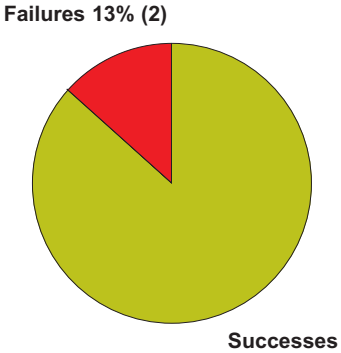
Total = 26

Figures 10-12 show orbital vs. suborbital launch events that occurred in the second quarter of 2005 and that are projected for the third quarter of 2005 and fourth quarter of 2005.

Launch Successes vs. Failures

(April 2005 – June 2005)

Figure 13: Second Quarter 2005 Launch Successes vs. Failures



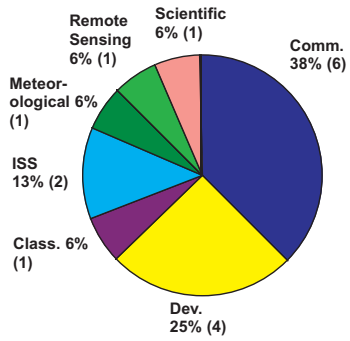
Total = 15

Figure 13 shows orbital and suborbital launch successes vs. failures for the period from April 2005 to June 2005. Partially-successful orbital launch events are those where the launch vehicle fails to deploy its payload to the appropriate orbit, but the payload is able to reach a useable orbit via its own propulsion systems. Cases in which the payload is unable to reach a useable orbit or would use all of its fuel to do so are considered failures.

Payload Use (Orbital Launches Only)

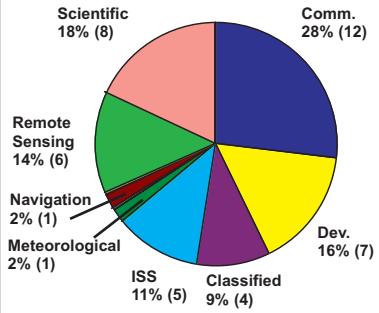
(April 2005 – December 2005)

Figure 14: Second Quarter 2005 Payload Use



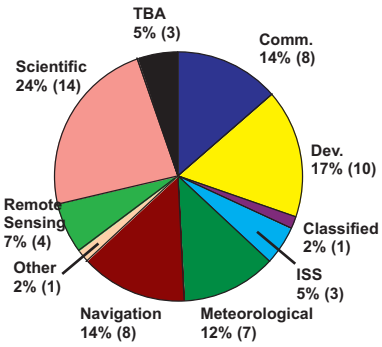
Total = 16

Figure 15: Third Quarter 2005 Projected Payload Use



Total = 44

Figure 16: Fourth Quarter 2005 Projected Payload Use



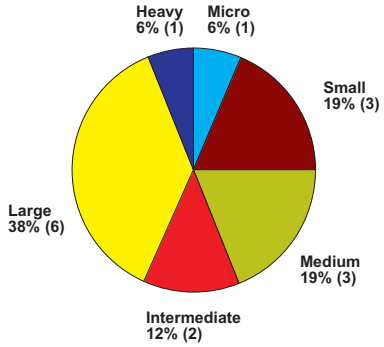
Total = 59

Figures 14-16 show total payload use (commercial and government), actual for the second quarter of 2005 and projected for the third quarter of 2005 and fourth quarter of 2005. The total number of payloads launched may not equal the total number of launches due to multi-manifesting, i.e., the launching of more than one payload by a single launch vehicle.

Payload Mass Class (Orbital Launches Only)

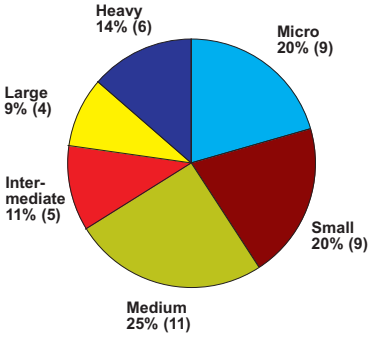
(April 2005 – December 2005)

Figure 17: Second Quarter 2005 Payload Mass Class



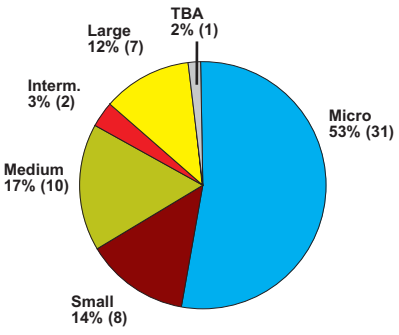
Total = 16

Figure 18: Third Quarter 2005 Projected Payload Mass Class



Total = 44

Figure 19: Fourth Quarter 2005 Projected Payload Mass Class

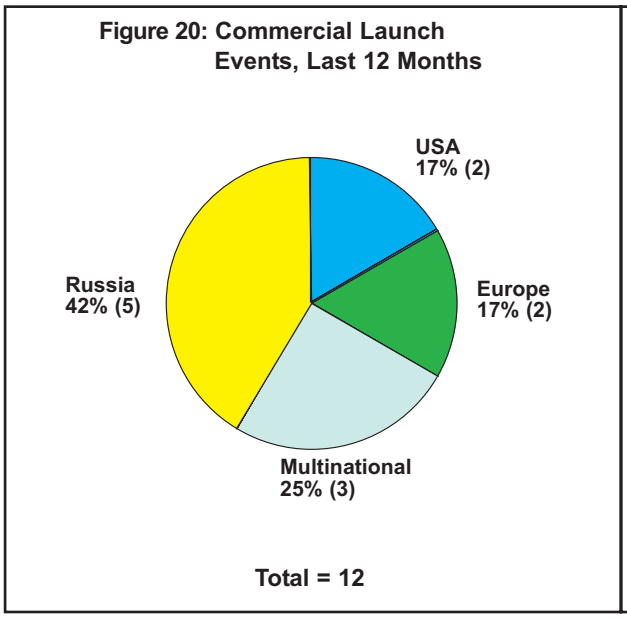


Total = 59

Figures 17-19 show total payloads by mass class (commercial and government), actual for the second quarter of 2005 and projected for the third quarter of 2005 and fourth quarter of 2005. The total number of payloads launched may not equal the total number of launches due to multi-manifesting, i.e., the launching of more than one payload by a single launch vehicle. Payload mass classes are defined as Micro: 0 to 91 kilograms (0 to 200 lbs.); Small: 92 to 907 kilograms (201 to 2,000 lbs.); Medium: 908 to 2,268 kilograms (2,001 to 5,000 lbs.); Intermediate: 2,269 to 4,536 kilograms (5,001 to 10,000 lbs.); Large: 4,537 to 9,072 kilograms (10,001 to 20,000 lbs.); and Heavy: over 9,072 kilograms (20,000 lbs.).

Commercial Launch Trends (Orbital Launches Only)

(July 2004 – June 2005)



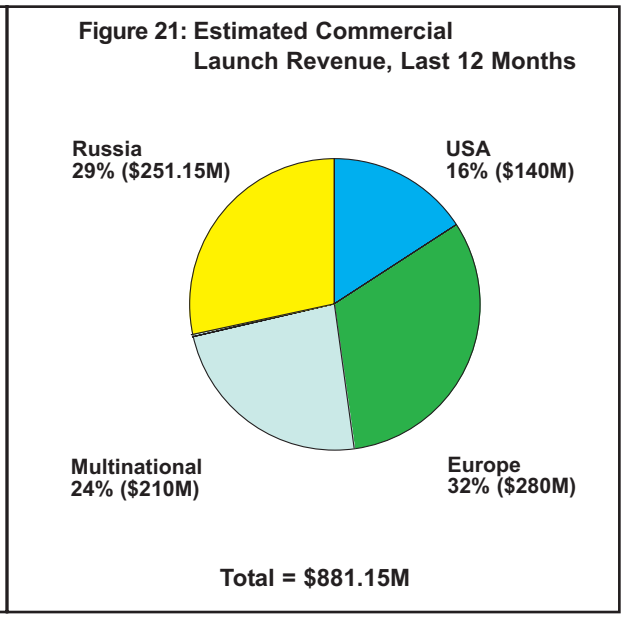


Figure 20 shows commercial orbital launch events for the period of July 2004 to June 2005 by country.

Figure 21 shows estimated commercial launch revenue for orbital launches for the period of July 2004 to June 2005 by country.

Commercial Launch Trends (Suborbital Launches Only)

(July 2004 – June 2005)

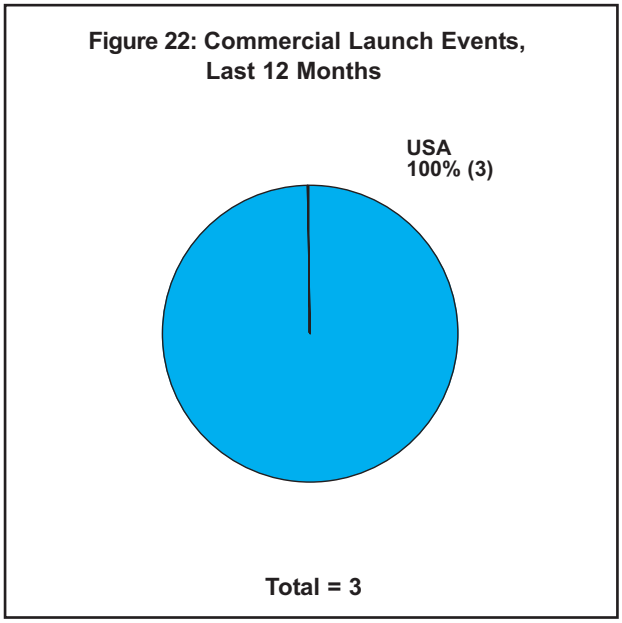


Figure 22 shows commercial suborbital launch events for the period of July 2004 to June 2005 by country.

Commercial Launch History
(January 2000 – December 2004)

Figure 23: Commercial Launch Events by Country, Last Five Years

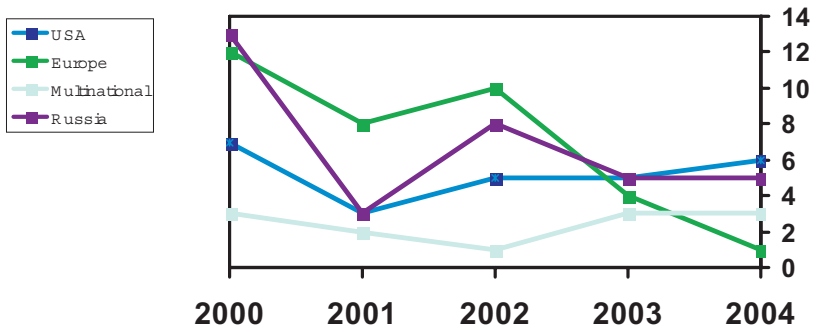


Figure 23 shows commercial launch events by country for the last five full years.

Figure 24: Estimated Commercial Launch Revenue (in $ million) by Country, Last Five Years

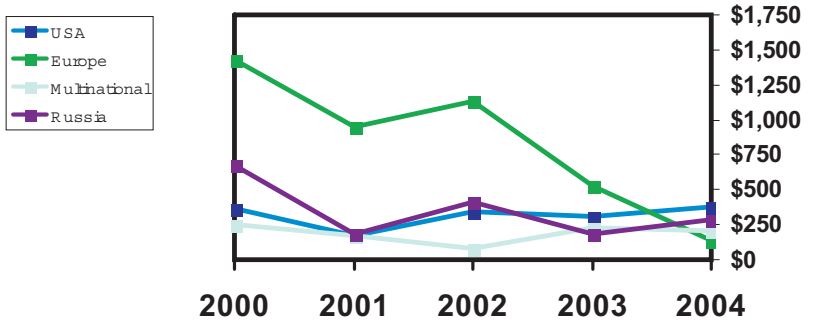


Figure 24 shows estimated commercial launch revenue by country for the last five full years.

Second Quarter 2005 Orbital and Suborbital Launch Events

Date			Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price	L	M
4/11/2005			Minotaur	VAFB		XSS-11	U.S. Air Force	Development	$14.5M	S	S
4/12/2005			Long March 3B	Xichang	*	APStar 6	APT Satellite Co., Ltd.	Communications	$60M	S	S
4/15/2005			Soyuz	Baikonur		Soyuz ISS 10S	Russian Federal Space Agency (Roscosmos)	ISS	$40M	S	S
4/15/2005			Pegasus XL	VAFB		DART	NASA	Development	$16M	S	F
4/26/2005	√	+	Zenit 3SL	Odyssey Launch Platform	*	Spaceway 1	Hughes Network Systems	Communications	$70M	S	S
4/29/2005			Titan 4B	CCAFS		NRO T1	National Reconnaissance Office (NRO)	Classified	$400M	S	S
5/5/2005			PSLV	Satish Dhawan Space Center		Cartosat 1	Indian Space Research Organization (ISRO)	Remote Sensing	$20M	S	S
						VUSat	Amsat India	Development		S	S
5/20/2005			Delta 2 7320	VAFB		NOAA N	National Oceanic and Atmospheric Administration (NOAA)	Meteorological		S	S
5/22/2005	√		Proton M	Baikonur	*	DirecTV 8	DirecTV, Inc.	Communications	$70M	S	S
5/31/2005			Soyuz	Baikonur		Foton M2	European Space Agency (ESA)	Scientific	$40M	S	S
6/17/2005			Soyuz	Baikonur		Progress ISS	Roscosmos	ISS	$40M	S	S
6/21/2005	√		Volna	Barents Sea		Cosmos 1	The Planetary Society	Development	$1.15M	F	F
6/21/2005			Molniya	Plesetsk		Molniya 3K	Roscosmos	Communications	$35M	F	F
6/23/2005	√	+	Zenit 3SL	Odyssey Launch Platform	*	Intelsat Americas 8	Intelsat	Communications	$70M	S	S
6/24/2005			Proton K	Baikonur	*	Express AM3	Russian Satellite Communciation Co. (RSCC)	Communications	$72.5M	S	S

√ Denotes commercial launch, defined as a launch that is internationally competed or FAA-licensed.

+ Denotes FAA-licensed launch.

* Denotes a commercial payload, defined as a spacecraft that serves a commercial function or is operated by a commercial entity.

Notes: All prices are estimates, and vary for every commercial launch. Government mission prices may be higher than commercial prices.

Ariane 5 payloads are usually multi-manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.

Third Quarter 2005 Projected Orbital and Suborbital Launch Events

Date			Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
7/6/2005			Long March 2D	Jiuquan		SJ 7	China Academy of Space Technology (CAST)	Development	$22.5M
7/10/2005			M 5	Uchinoura		Astro-E2	Japan Aerospace Exploration Agency (JAXA)	Scientific	$50M
7/28/2005	√	+	Delta 4 Medium	CCAFS		GOES N	NOAA	Meteorological	$70M
7/2005			Shuttle Discovery	KSC		STS 114	NASA	ISS	N/A
						ISS LF-1	NASA	ISS	
7/2005	√		Ariane 5G	Kourou	*	Thaicom 4 (IPstar)	Shin Satellite Public Co.	Communications	$140M
7/2005			Proton K	Baikonur	*	Yamal 203	Gazkom Joint Stock	Communications	$72.5M
					*	Yamal 204	Gazkom Joint Stock	Communications	
8/1/2005	√		Soyuz	Baikonur	*	Galaxy 14	Panamsat	Communications	$70M
8/10/2005	√		Proton M	Baikonur	*	Anik F1R	Telesat Canada	Communications	$70M
8/10/2005			Atlas 5 401	CCAFS		Mars Reconnaissance Orbiter	NASA	Scientific	$75M
8/15/2005			Dnepr 1	Baikonur		OICETS	JAXA	Scientific	$9.5M
						INDEX	JAXA	Scientific	
8/18/2005			Rockot	Baikonur		Monitor E1	Roscosmos	Remote Sensing	$13.5M
8/24/2005			Soyuz	Baikonur		Progress ISS 19P	Roscosmos	ISS	$70M
8/25/2005	√		Kosmos 3M	Plesetsk		Topsat	British Defense Ministry	Development	$12M
						China DMC+4	Beijing Landview Mapping Information Technology Ltd	Remote Sensing	
						Mesbah	Telecommunications Company of Iran	Communications	
						Mozhayets 5	Mozhaiskiy Military Space Engineering Academy	Development	
						Ncube-2	Norwegian Student Satellite Project	Development	
						Sinah-1	Iran	Classified	
						SSETI Express	Aalborg University	Development	
						UWE-1	University of Wurzburg	Scientific	
						XI-V	University of Tokyo ISSL	Development	
8/30/2005			Delta 4 Medium Plus	VAFB		NRO L-22	DoD	Classified	$77.5M
8/2005			Delta 2 7925-10	CCAFS		Navstar GPS 2RM-1	U.S. Air Force	Navigation	$50M
8/2005			H 2A 202	Tanegashima		ALOS 1	JAXA	Remote Sensing	$85M
8/2005	√		Ariane 5 ECA	Kourou	*	Spaceway 2	Hughes Network Systems	Communications	$140M
					*	Telkom 2	PT Telkomunikasi	Communications	
8/2005			Long March 2D	Jiuquan		FSW 21	China National Space Administration (CNSA)	Scientific	$22.5M
9/9/2005			Titan 4B	CCAFS		NRO T5	NRO	Classified	$400M
9/11/2005			Delta 2 7420	VAFB		Calipso	NASA	Scientific	$50M
						CloudSat	NASA	Scientific	
9/15/2005	√		Rockot	Plesetsk		Cryosat	ESA	Remote Sensing	$13.5M
9/30/2005			Delta 2 7920	VAFB		NRO L-21	NRO	Classified	$50M
9/2005			Kosmos 3M	Baikonur		Vietnamsat	Vietnamese Ministry of Post and Telecommunications	Remote Sensing	$12M
						Thai-Paht 2	Thai MicroSatellite Co.	Remote Sensing	
9/2005			Ariane 5G	Kourou		Syracuse 3 A	Delegation Generale pour	Communications	$140M
					*	Galaxy 15	Panamsat	Communications	
9/2005	√		Proton M	Baikonur	*	Astra 1KR	SES Astra	Communications	$70M
9/2005			Shuttle Atlantis	KSC		STS 121	NASA	ISS	N/A
						ISS ULF-1.1	NASA	ISS	
9/2005			Falcon 1	Kwajalein Island		Falconsat 2	DoD	Development	$6M
3Q/2005	√		Proton M	Baikonur	*	Measat 3	Binariang Satellite Systems Sdn Bhd	Communications	$70M

√ Denotes commercial launch, defined as a launch that is internationally competed or FAA-licensed.

+ Denotes FAA-licensed launch.

* Denotes a commercial payload, defined as a spacecraft that serves a commercial function or is operated by a commercial entity.

Notes: All prices are estimates, and vary for every commercial launch. Government mission prices may be higher than commercial prices.

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Fourth Quarter 2005 Projected Orbital and Suborbital Launch Events

Date			Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
10/12/05			Delta 2 7925-10	CCAFS		Navstar GPS 2RM-4	U.S. Air Force	Navigation	$50M
10/26/05			Soyuz	Baikonur		Venus Express	ESA	Scientific	$40M
10/28/05			Delta 4 Heavy	CCAFS		DSP 23	U.S. Air Force	Classified	$155M
10/2005			Soyuz	Baikonur		Soyuz ISS 11S	Roscosmos	ISS	$40M
10/2005	√		Dnepr 1	Baikonur		Egyptsat	National Authority for Remote Sensing	Remote Sensing	$9.5M
					*	AKS 1	CNES	Development	
					*	AKS 2	CNES	Development	
					*	Cubesat TBA	The Aerospace Corporation	Development	
						HAUSat 1	Hankuk Aviation University	Scientific	
						ICEcube 1	Cornell University	Scientific	
						ICEcube 2	Cornell University	Scientific	
						ION	University of Illinois	Development	
						KUTESat	Kansas University	Scientific	
						Mea Huaka'I	University of Hawaii	Scientific	
						Merope	Montana State University	Scientific	
						Ncube	Norwegian Student Satellite Project	Scientific	
						Polysat 1	Cal Poly	Development	
						Polysat 2	Cal Poly	Development	
						Rincon 1	University of Arizona	Scientific	
						Sacred	University of Arizona	Scientific	
						SaudiComsat 3	Space Research Institute	Communications	
						SaudiComsat 4	Space Research Institute	Communications	
						SaudiComsat 5	Space Research Institute	Communications	
						SaudiComsat 6	Space Research Institute	Communications	
						SaudiComsat 7	Space Research Institute	Communications	
						Saudisat 3	Space Research Institute	Scientific	
						SEEDS	Nihon University	Scientific	
10/2005			Soyuz	Baikonur		Galileo System Test	ESA	Navigation	$40M
10/2005			Long March 2F	Jiuquan		Shenzhou 6	CNSA	ISS	$60M
10/2005			PSLV	Satish Dhawan		Cartosat 2	ISRO	Remote Sensing	$20M
						Anusat	ISRO	Communications	
						SRE 1	ISRO	Development	
11/25/05	√	+	Pegasus XL	Kwajalein Island		C/NOFS	U.S. Air Force	Scientific	$16M
11/2005	√		Proton M	Baikonur	*	WORLDSAT-3	SES Americom	Communications	$70M
11/2005			Delta 4 Medium	VAFB		DMSP 5D-3-F17	DoD	Meteorological	$70M
11/2005	√		Ariane 5 TBA	Kourou	*	Payload TBA	TBA	TBA	$140M
						Payload TBA	TBA	TBA	
12/21/05			Soyuz	Baikonur		Progress ISS 20P	Roscosmos	ISS	$40M
12/2005	√		Rockot	Plesetsk		Kompsat 2	Korea Aerospace Research Institute (KARI)	Remote Sensing	$13.5M
4Q/2005			Delta 2 7925-10	CCAFS		Navstar GPS 2RM-2	U.S. Air Force	Navigation	$50M
4Q/2005			Delta 2 7925-10	CCAFS		Navstar GPS 2RM-3	U.S. Air Force	Navigation	$50M
4Q/2005			Minotaur	VAFB		Formosat 3 A	National Space Program Office (NSPO)	Meteorological	$14.5M
						Formosat 3 B	NSPO	Meteorological	
						Formosat 3 C	NSPO	Meteorological	
						Formosat 3 D	NSPO	Meteorological	
						Formosat 3 E	NSPO	Meteorological	
						Formosat 3 F	NSPO	Meteorological	
4Q/2005			Falcon 1	Kwajalein Island		TacSat 1	U.S. Air Force	Development	$6M
						Celestis 5	Celestis, Inc.	Other	
4Q/2005	√	+	Zenit 3SL	Odyssey Launch Platform	*	Inmarsat-4 F2	Inmarsat	Communications	$70M
4Q/2005	√	+	Zenit 3SL	Odyssey Launch Platform	*	TBA	TBA	TBA	$70M
2005			Soyuz	Plesetsk		Resurs DK 1	Roscosmos	Remote Sensing	$40M
2005			Proton K	Baikonur		Glonass K R1	Russian MoD	Navigation	
						Glonass K R2	Russian MoD	Navigation	
						Glonass K R3	Russian MoD	Navigation	
2005	√	+	Falcon 1	Kwajalein Island		RazakSAT	Malaysia National Space Agency	Development	$6M
2005			Long March 3A	Xichang		Beidou 2A (Compass	CNSA	Navigation	$50M
2005			Kaituozhe 1	Taiyuan		China Microsat TBA	CAST	Development	$10M
2005			Long March 2D	Jiuquan		FSW 22	CAST	Scientific	$22.5M

√ Denotes commercial launch, defined as a launch that is internationally competed or FAA-licensed.

\+ Denotes FAA-licensed launch.

* Denotes a commercial payload, defined as a spacecraft that serves a commercial function or is operated by a commercial entity.

Notes: All prices are estimates, and vary for every commercial launch. Government mission prices may be higher than commercial prices.

Ariane 5 payloads are usually multi-manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.